Case Report

Intraoperative neurological event during cesarean section under spinal anesthesia with fentanyl and bupivacaine: Case report and review of literature

Bikash Ranjan Ray, Dalim Kumar Baidya[1], Deepak Mathew Gregory, Rani Sunder

Department of Anaesthesia, All India Institute of Medical Sciences, New Delhi, [1]LiverTransplant Anaesthesia and Critical Care, Fortis Hospital, Noida, Delhi-NCR, India

Abstract

Neurological events similar to transient ischemic attack in a peripartum woman are uncommon. Cerebral complications of preeclampsia, thrombo-embolic phenomena, or high spinal can mimic such situations. Spinal anesthesia with local anesthetic and opioid is an established anesthetic technique for cesarean section. Although intrathecal opioids are safe for both the mother and fetus; some unusual complications such as dysphagia alone or associated with facial numbness, aphasia, have been reported. We report a case of transient aphonia and tingling sensation over the face without any dysphagia after intrathecal administration of bupivacaine and fentanyl for cesarean section.

Key words: Cesarean section, neurological event, spinal anesthesia

Introduction

Addition of opioids as adjuvant to local anesthetic for spinal or combined spinal-epidural anesthesia (CSE) is a routine practice for cesarean section. There are few reports of unusual complications like dysphagia, facial numbness, aphasia following intrathecal opioids for labor analgesia.[1-5] We describe a case of transient aphonia and facial tingling after spinal anesthesia with bupivacaine-fentanyl for cesarean section and review the relevant literature.

Case Report

A 31-year-old, 54 kg, 155 cm, gravida-3, Para-1,37 weeks gestation, woman was admitted with complaint of tenderness at the site of previous cesarean section scar. She had an uneventful cesarean section under subarachnoid block 2½ years back and no other past medical illness. Her antenatal course was unremarkable. On examination, her blood pressure (BP) was 130/74 mmHg, pulse 94/minute and respiratory rate (RR) 18/minute. Ultrasonography revealed normally beating fetal heart at 140/minute. In view of the possible impending uterine rupture, the patient was scheduled for an urgent cesarean section.

In the operating room, standard monitoring was initiated and subarachnoid block was given in left lateral position with median approach at L_{2-3} interspace in the first attempt. Bupivacaine 7.5 mg (1.5 ml of 0.5% hyperbaric bupivacaine) with fentanyl 25mcg was injected after free flow of cerebro-spinal fluid. The patient was made supine, oxygen was supplemented by facemask and Ringer's solution was administered intravenously. Two minutes after spinal anesthesia, her pulse was 95/minute, BP 126/72mmHg and at 5 minutes, her pulse was 103/minute, BP 109/65mmHg, RR 20/min and peripheral oxygen saturation (SpO_2)99%. T_4 level of sensory block was achieved and surgery was started. A healthy female baby was delivered after 5minutes with normal APGAR score. Three minutes after the delivery of the baby, the patient complained of weakness of voice and tingling sensation over the face, immediately followed by complete inability to speak. She was anxious but her vital signs were stable with SpO_2 99%, pulse 104/minute, BP 110/64 mmHg and RR 16/minute. Sensory block

Address for correspondence: Dr. Dalim Kumar Baidya,
B-102, Dell, HRC Professional Hub,
Indirapuram, Ghaziabad, Uttar Pradesh, India.
E-mail: dalimkumarb001@yahoo.co.in

Access this article online

Quick Response Code:

Website: www.joacp.org

DOI: 10.4103/0970-9185.98349

was reassessed and found to be fixed at T_4 level. She was conscious, alert, and able to follow commands. There was no difficulty in swallowing. The baby was shown to her and she was reassured. After 20 minutes, her aphonia resolved. The rest of the surgery was uneventful. Postoperatively, the patient was monitored in the recovery room and neurological examination revealed normal higher function, normal cranial nerve function with no sensory-motor abnormality. There was no history suggestive of preeclampsia or absence seizures. Magnetic Resonance Imaging (MRI) with diffuse weighed scan, duplex ultrasound for deep vein thrombosis, carotid artery Doppler, electroencephalography (EEG), and transthoracic echocardiography were all normal. Subsequent postpartum course was uneventful. She was followed up in neurology for three months without any complications.

Discussion

The differential diagnoses of such clinical presentation of sudden and transient neurological event could be transient ischemic attack (TIA), cerebral complications of preeclampsia, absence seizures and complications of spinal anesthesia. Available literature on acute cerebro-vascular syndrome in pregnancy involves mainly cases of preeclampsia complicated with cerebral edema, vasospasm, intracranial haemorrhage, or reversible ischemic neurological deficit.[6-8] This patient, however, did not have any features of preeclampsia and all BP readings during antenatal period were normal.

TIA is a transient neurological event, which usually persists for minutes and can occur due to hypotension, hypoxia, or embolism. However, the patient did not have any hypoxia or hypotension. Thrombo-embolism or amniotic fluid embolism is a rare event during pregnancy with variable presentation.[9,10] Duplex ultrasound and carotid artery Doppler were normal suggesting against any venous or arterial embolus. There is no report so far of amniotic fluid embolism presenting as TIA. However, in such clinical situations, when TIA is suspected, the patient should be assessed with ABCD2 score for early stroke risk (A = age>60 years [1 point]; B = blood pressure>140/90 mmHg [1 point]; C = Clinical features, including unilateral weakness [2 points] and speech disturbance without weakness [1 point]; D2 = Diabetes [1 point] and Duration of symptoms [1 point for < 60 min and 2 points for > 60 min]). Early stroke risk is high if ABCD2 score ≥ 4.[11] The ABCD2 score in this patient was 2 (speech disturbance without weakness [1 point] and duration of symptoms <60minutes [1 point]). Other risk factors like acute ischemic lesions on diffusion weighted MRI, carotid stenosis, atrial fibrillation, patent foramen ovale, microembolic signals on transcranial Doppler were all ruled out. MRI of this patient was normal and transcranial Doppler was not performed. However, >50% patients of TIA have normal MRI. The patient was followed-up for 3 months as there is 10-20% risk of major stroke in TIA in subsequent 3 months.[12]

There are several reports of acute neurological events (either hemorrhagic or ischemic) like hemiparesis, dysarthria, visual defect, tinnitus, etc in term parturients with Moyamoya disease. Moyamoya disease, most common in East Asia, is characterized by steno-occlusive changes of the terminal portions of intracranial part of internal carotid artery and development of network of small collaterals in the base of the brain visualized as puff of cigarette smoke in angiography.[13] Since MRI was normal, this was not considered.

Absence seizure was not considered as there was no history of similar episodes anytime in childhood and EEG was normal.[14] Hypotension or hypoxia following spinal anesthesia could be a possibility. However, the patient was conscious, hemodynamically stable with normal respiratory rate and SpO_2. Literature search to explain such phenomenon revealed some unusual complications following intrathecal drugs for labour analgesia [Table 1].

In a seriesof six parturients,[1] difficulty in breathing, facial numbness and dysphagia were reported after administration of intrathecalsufentanil10 mcg for labor analgesia. Similar incident was described in another patient following use of intrathecal sufentanil 10 mcg for labor analgesia. The symptoms started 3 minutes after intrathecal injection of drug and disappeared within 5 minutes.[2] Effect of opioids on fifth and ninth cranial nerve was implicated in these cases.

Currier *et al.*[3] described two cases of dysphagia after administration of intrathecal fentanyl as a part of CSE technique for labor analgesia. One patient developed dysphagia 1hour after intrathecal fentanyl 20 mcg, which resolved in 30 minutes. The other patient developed generalized itching, dysphagia, and tingling sensation around lips 20 minutes after intrathecal fentanyl 25 mcg and bupivacaine 2.5 mg, which resolved within 60 minutes. Cephaloid spread of fentanyl was implicated as the cause. As sitting position was used in both the case for block, the relative hypobaricity of the narcotic/narcotic-local anaesthetic mixture, added by the postural effect was implicated for the rostral spread. No aphonia was reported.

A 40-year-old woman who received CSE with sufentanil10 mcg and isobaric bupivacaine 2.5 mg in sitting position for labor analgesia, developed aphasia, altered mentation, increased salivation, and dysphagia5minutes after CSE and all the symptoms resolved in 90minutes, without any intervention. The authors attributed rostral spread of either of the opioid

Table 1: Complications following intrathecal opioids

Authors	Procedure	Number of patients	Intrathecal Drug	Complication
Hamilton CLand co-workers[1] 1995	Labor analgesia	6	Sufentanil 10 mcg	1- Dysphagia, itching on face 2- Facial and lip tingling 3- Dysphagia, facial and upper limb numbness 4- Dysphagia, dry throat 5- Facial tingling 6- Unilateral facial numbness
Cohen SE and co-workers[2]1993	Labor analgesia	1	Sufentanil 10 mcg	Transient difficulty in taking deep breath, facial numbness and dysphagia
Currier D Sand co-workers[3] 1997	Labor analgesia	Patient 1	Fentanyl 20 mcg	Dysphagia and inability to clear throat
		Patient 2	Fentanyl 25 mcg and bupivacaine 2.5 mg	Generalised itching, dysphagia, tingling around lips and fingertips
Fragneto R Yand co-workers[4] 2000	Labor analgesia	1	Sufentanil 10 mcg + bupivacaine 2.5 mg	Mental status change, aphasia, increased salivation, dysphagia
Kuczkowki K. Mand co-workers[5] 2003	Labor analgesia	1	Fentanyl 10 mcg + bupivacaine 2.5 mg	Dysphagia and inability to talk

or hypobaric local anesthetic affecting the speech area, as the reason of the symptoms.[4] A case of aphonia and dysphagia lasting 20 minutes was reported after intrathecal administration of fentanyl 10 mcg with bupivacaine 2.5 mg in sitting position for labor analgesia.[5] Cephaloid spread of fentanyl was implicated again.

Our patient had aphonia and abnormal facial sensations 13 minutes after the intrathecal injection. Rostral spread of the drugs through CSF to the cerebral cortex affecting the speech area or the cranial nerves is aprobability. Rapid rostral spread of lipophilic opioids like fentanyl had been reported.[15] Notably, absence of other side effect of opioids (respiratory depression, pruritus) is difficult to explain. Hypoesthesia of the face is suggestive of cephalad spread of local anesthetic, but there were no characteristic of high spinal block (level was T_4). The transient nature of these symptoms suggests opioid rather than local anesthetic as the culprit, as rapid clearance of fentanyl from the CSF resulted in disappearance of symptoms.

Position of the patient and baricity of the drug at the time of block had been found to affect the rostral spread of drug. Unlike other reported cases, in the present case subarachnoid block was given in a lateral position and hyperbaric bupivacaine was used. Greater cephalad spread of sensory block was found when intrathecal fentanyl and bupivacaine were administered in sitting as compared to lateral position.[16] However, the effect of sudden change of position (from lateral to supine) on the spread of drug is not known. In pregnant women, presence of wider pelvis makes the vertebral column inclined towards the head end in lateral position, which may increase the cephalad spread of intrathecal drugs.

Baricity of the mixture of fentanyl and hyperbaric bupivacaine is not known. In an in-vitro study, addition of fentanyl to isobaric bupivacaine was found to decrease the baricity of the mixture.[17] Cephalad spread of hypobaric solution is more than that of hyperbaric solution, but studies show that density has little effect on intrathecal spread of drugs in full term pregnancy.[18,19] Though the possibility of rostral spread of fentanyl-bupivacaine mixture is less with use of hyperbaric bupivacaine and lateral position, it cannot be excluded. However, 10° head up tilt can reduce the extent of cephalad spread.[20]

In summary, transient neurological events like aphonia and facial tingling can occur following intrathecal administration of fentanyl and bupivacaine for cesarean section. Presence of high spinal block should be excluded and the patient reassured. Possibility of TIA, cerebral complication of preeclampsia and Moyamoya disease should be ruled out in appropriate clinical setting.

References

1. Hamilton CL, Cohen SE. High sensory block after intrathecal sufentanil for labor analgesia. Anesthesiology 1995;83:1118-21.
2. Cohen SE, Cherry CM, Holbrook RH, El-Sayed YY, Gibson RN, Jaffe RA. Intrathecalsufentanil for labor analgesia-sensory changes, side effects, and fetal heart rate changes. AnesthAnalg 1993;77:1155-60.
3. Currier DS, Levin KR, Campbell C. Dysphagia with intrathecal fentanyl. Anesthesiology 1997;87:1570-1.
4. Fragneto RY, Fisher A. Mental status change and aphasia after labor analgesia with intrathecal sufentanil/bupivacaine. Anesth Analg 2000;90:1175-6.
5. Kuczkowki KM,Goldsworthy M. Transient aphonia and aphagiain a parturient after induction of combined spinal-epidural labor analgesia with subarachnoid fentanyl and bupivacaine. Acta Anaesth Belg 2003;54:165-6.
6. Shieh T, Kosasa TS, Tomai E, Nakayama RT. Transient blindness in a preeclamptic patient secondary to cerebral edema. Hawaii Med J 1996;55:116-7.

7. Williams K, McLean C. Maternal cerebral vasospasm in eclampsia assessed by transcranial Doppler. Am J Perinatol 1993;10:243-4.
8. Watanabe K, Kii N, Hatakenaka S, Yoshimura Y, Nakago K, Mochizuki T, *et al.* A case of transient cortical blindness due to reversible ischemic neurological deficit after caesarean section under lumbar anesthesia. Masui 1997;46:1122-6.
9. Fletcher SJ, Parr MJ. Amniotic fluid embolism: A case report and review. Resuscitation 2000;43:141-6.
10. O'Connor DJ, Scher LA, Gargiulo NJ 3rd, Jang J, Suggs WD, Lipsitz EC. Incidence and characteristics of venous thromboembolic disease during pregnancy and the postnatal period: A contemporary series. Ann VascSurg 2011;25:9-14.
11. Merwick A, Kelly PJ. Transient ischaemic attack clinics and management of transient ischaemic attacks. Curr Opin Neurol 2011;24:50-8.
12. Sylaja PN, Hill MD. Current management of transient ischemic attack. Am J Cardiovasc Drugs 2007;7:67-74.
13. Kato R, Terui K, Yokota K, Nakagawa C, Uchida J, Miyao H. Anesthetic management for cesarean section in moyamoya disease: A report of five consecutive cases and a mini-review. Int J Obstet Anesth 2006;15:152-8.
14. Hughes JR. Absence seizures: A review of recent reports with new concepts. Epilepsy Behav 2009;15:404-12.
15. Gourlav GK,Murphy TM, Plummer JL, Kowalski SR, Cherry DA, Cousins MJ. Pharmacokinetics of fentanyl in lumbar and cervical CSF following lumbar epidural and intravenous administration. Pain1989;38:253-9.
16. Richardson MG, Thakur R, Abramowicz JS, Wissler RN. Maternal posture influences the extent of sensory block intrathecal dextrose-free bupivacaine with fentanyl for labor analgesia. Anesth Analg 1996;83:1229-33.
17. Parlow JL, Money P, Chan PS, Ramond J, Milne B. Addition of opiods alters the density and spread of intrathecal local anesthetics? An *in vitro* study. Can J Anaesh 1999;46:66-70.
18. Connolly C, McLeod GA, Wildsmith JA. Spinal anaesthesia for caesarean section with bupivacaine 5 mg ml^{-1} in glucose 8 or 80 mg ml^{-1}. Br J Anaesth 2001;6:805-7.
19. Srivastava U, Kumar A, Gandhi NK, Saxena S, Dutta D, Chandra P, *et al.* Hyperbaric or plane bupivacaine combined with fentanyl for spinal anaesthesia during caesarean delivery. Indian J Anaesth 2004;48:44-6.
20. Loke GP, Chan EH, Sia AT. The effect of 10 degrees of head-up tilt in the right lateral position on the systemic blood pressure after subarachnoid block for caesarean section. Anaesthesia 2002;57:169-72.

How to cite this article: Ray BR, Baidya DK, Gregory DM, Sunder R. Intraoperative neurological event during cesarean section under spinal anesthesia with fentanyl and bupivacaine: Case report and review of literature. J Anaesthesiol Clin Pharmacol 2012;28:374-7.
Source of Support: Nil, **Conflict of Interest:** None declared.